

REMARKS

Claims 1, 3, 4, and 6-12 are now pending in the application. Claims 1 and 7 have been amended to incorporate the subject matter of Claims 2 and 5. Claims 2 and 5 are, accordingly, cancelled. The Examiner is respectfully requested to reconsider and withdraw the rejections in view of Applicant's amendments and remarks.

REJECTION UNDER 35 U.S.C. § 112

The Office Action rejected Claims 2, 3, and 7-10 under 35 USC § 112, second paragraph, as being indefinite. Applicants respectfully traverse the rejection with respect to amended claim 1 and claims 3 and 7-10.

The recitation of "about" in conjunction with the value of 50 is not indefinite. "About" used with a numerical value that is readily ascertainable by a person skilled in the art is clear but flexible and not indefinite. *Ex parte Eastwood*, 163 USPQ 316 (Bd. App. 1968). Furthermore, "about" is not inherently indefinite when modifying the endpoint of a range. *W.L. Gore & Assoc., Inc. v. Garlock, Inc.*, 220 USPQ 303, 316 (Fed. Cir. 1983). In addition, a person skilled in the art would recognize the uretdione compounds of Claim 1 where the repeating unit number "n" is about 50. Thus, Claim 1 is not indefinite, and Applicant respectfully requests reconsideration.

In respect to Claims 7-10, Claim 7 is a method of making an aqueous dispersion coating that includes "salting the water-dispersible resin if necessary." Salting is recognized by a skilled artisan as it is used in electrodeposition, and it is also explained in the specification within paragraph [0016]. For example, the aqueous coating composition can be made from a water dispersible active hydrogen-functional resin.

These “water-dispersible resins can contain ionizable groups that are salted to stably disperse the resin.” And “for electrocoating compositions, the resin is preferably cathodic, i.e., it has basic groups and is salted with an acid.” One of ordinary skill in the art would recognize that salting the water-dispersible resin is necessary for dispersing the resin mixture in water. Applicant respectfully traverses the rejection and requests reconsideration.

REJECTIONS UNDER OBVIOUSNESS-TYPE DOUBLE PATENTING

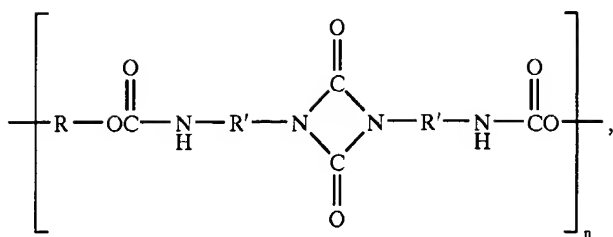
The Office Action provisionally rejected Claims 1-6, 11, and 12 under obviousness-type double patenting in respect to Claims 5-10 of co-pending U.S. App. No. 10/723,899 (Pub. No. 20050113509).

Applicant respectfully traverses the rejection pending issuance of the aforementioned application.

REJECTION UNDER 35 U.S.C. § 102 – MOSBACH ET AL. U.S. PATENT NO. 5,098,983

Claims 1, 2, 7, 8, and 11 are rejected under 35 USC § 102(b) as being anticipated by Mosbach et al., U.S. Pat. No. 5,098,983. This rejection is respectfully traversed.

The present claims are directed to an aqueous, electrodepositable coating composition that includes a dispersion of an active hydrogen-functional epoxy resin and an uretdione compound. The uretdione compound comprises the structure:



Thus, the uretdione compound is formed of one unit or of repeating units, each containing the residue of a diol and two diisocyanates. Such an uretdione compound is an express component of Claim 1 of the present application.

On the other hand, the Mosbach reference deals with a mixture of polyisocyanates. The mixture can include a content of (cyclo)aliphatically bound isocyanate groups, a content of chemically incorporated carboxyl groups, and a content of (cyclo)aliphatically bound uretdione groups. See Mosbach, col. 2, lines 1-9. These mixtures always contain carboxyl groups (col. 2, lines 4-5) or a hydroxycarboxylic acid component (col. 2, lines 18-20).

Consequently, the mixtures of polyisocyanates in the Mosbach reference are not an uretdione compound as used in the present invention. Mosbach does not teach use of an uretdione compound formed of repeating units including a diol residue and two diisocyanates that form an uretdione. And examples of polyisocyanate mixtures in the Mosbach reference only contain between 11-17% uretdione groups. See Mosbach examples 1, 2, and 5-7; and see example 3, which uses the polyisocyanate mixture of example 2.

The present invention, therefore, contains a particular uretdione crosslinker and not the Mosbach reference's mixture of polyisocyanates, in which only a fraction of the crosslinker includes uretdione groups. Accordingly, the Mosbach reference does not

anticipate the present invention. Applicant respectfully requests withdrawal of the rejection and reconsideration of the claims.

REJECTION UNDER 35 U.S.C. § 102 – AHMED ET AL. U.S. PATENT NO. 5,500,460

Claims 1-4, 7, 8, and 11 are rejected under 35 USC § 102(b) as being anticipated by Ahmed et al., U.S. Pat. No. 5,500,460. This rejection is respectfully traversed.

The present invention deals expressly with an aqueous, electrodepositable coating composition that includes a dispersion of an active hydrogen-functional epoxy resin and an uretdione compound. Electrodepositable coatings and the electrodeposition process are illustrated in paragraphs [0003] to [0006] of the present application. Briefly, “during electrodeposition, coating material containing an ionically-charged resin having a relatively low molecular weight is deposited onto a conductive substrate by submerging the substrate in an electrocoat bath having dispersed therein the charged resin and then applying an electrical potential between the substrate and a pole of opposite charge” (paragraph [0005]).

In contradistinction, the Ahmed reference discloses an autodeposition bath composition with which active metal surfaces can be coated (*e.g.*, the dispersions of Examples 1 & 2 are used in the autodeposition baths of Examples 5 & 6; and see Claim 1). “[T]he term ‘active metal’ is to be understood as iron and all the metals and alloys more active than iron in the electromotive series.” See Ahmed col. 1, lines 21-23. And “[a]utodeposition is often contrasted with electrodeposition, which can produce very similar adherent films but requires that the surfaces to be coated be connected to a source of direct current electricity for coating to occur.” See col. 1, lines 27-30.

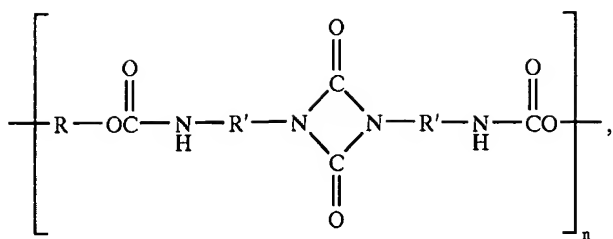
Therefore, the aqueous, electrodepositable coating composition of the present application and the autodeposition bath composition of Ahmed are not the same compositions. Electrodeposition and autodeposition function by dissimilar means and are applied by different physical principles. As a consequence, Ahmed does not teach the aqueous, electrodepositable coating composition of the present application. Accordingly, Applicant respectfully requests withdrawal of the rejection and reconsideration of the claims.

REJECTION UNDER 35 U.S.C. § 102 – YAMAGUCHI ET AL. U.S. PATENT NO. 6,337,108

Claims 1-4, 7, 8, and 11 are rejected under 35 USC § 102(b) as being anticipated by Yamaguchi et al., U.S. Pat. No. 6,337,108. This rejection is respectfully traversed.

The present invention deals expressly with an aqueous, electrodepositable coating composition that includes a dispersion of an active hydrogen-functional epoxy resin and an uretdione compound. Electrodepositable coatings and the electrodeposition process are illustrated in paragraphs [0003] to [0006] of the present application. Briefly, “during electrodeposition, coating material containing an ionically-charged resin having a relatively low molecular weight is deposited onto a conductive substrate by submerging the substrate in an electrocoat bath having dispersed therein the charged resin and then applying an electrical potential between the substrate and a pole of opposite charge” (paragraph [0005]).

Of equal importance, and as previously stated, the present invention deals expressly with an uretdione compound. The uretdione compound comprises the structure:



Thus, the uretdione compound is formed of repeating units, each containing the residue of a diol and an uretdione, formed of two diisocyanates. Such an uretdione compound is an express component of Claim 1 of the present application.

In contradistinction, the Yamaguchi reference discloses a powder paint composition applied via electrostatic spray to form an electrostatic coating. See col. 1, lines 19-20; col. 9, lines 8-13; and see Claim 1. The powder paint composition of Yamaguchi is different from the aqueous, electrodepositable coating composition of the present invention. Both the physical application and the components for use of the Yamaguchi powder paint composition and the present invention are different.

Likewise, the process for forming multi-layer coats disclosed in Yamaguchi does not include elements of the present invention. The multi-layer process of Yamaguchi (see col. 7, line 8; Example 1; and Claim 2) forms a powder coated film which is not completely cured and then dipped in an electrodeposition bath (col. 7, lines 29-49; and Example 1). It should be noted that the electrodeposition paint used in Yamaguchi is not the same coating composition as the powder paint composition used. For example, “[t]he crosslinking agent contained in the cationic electrodeposition paint can be a blocked polyisocyanate prepared by reacting a polyisocyanate with a blocking agent such as alcohols, phenols, oximes, lactams, etc.” See col. 10, lines 4-8. This crosslinking agent is not the same as the uretdione compound of the present invention,

which is a self-conjugated diisocyanate that is self-blocking via the uretdione structure, and further reacted with a diol to produce the oligomeric crosslinker structure shown above.

Consequently, the powder paint composition and process for forming multi-layer coats in the Yamaguchi reference do not include the aqueous, electrodepositable coating composition, including the self-blocked uretdione compound, used in the present invention.

REJECTION UNDER 35 U.S.C. § 102 – SAPPER ET AL. U.S. PATENT NO. 6,296,903

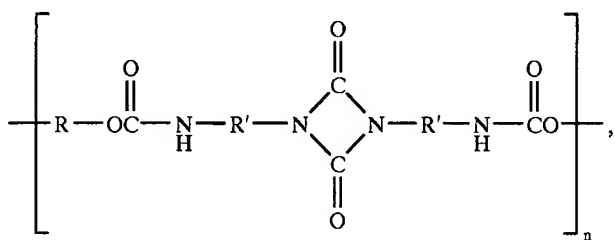
Claims 1-9, 11, and 12 are rejected under 35 USC § 102(b) as being anticipated by Sapper et al., U.S. Pat. No. 6,296,903. This rejection is respectfully traversed.

The present invention deals expressly with an aqueous, electrodepositable coating composition that includes a dispersion of an active hydrogen-functional epoxy resin and an uretdione compound. Electrodepositable coatings and the electrodeposition process are illustrated in paragraphs [0003] to [0006] of the present application. Briefly, “during electrodeposition, coating material containing an ionically-charged resin having a relatively low molecular weight is deposited onto a conductive substrate by submerging the substrate in an electrocoat bath having dispersed therein the charged resin and then applying an electrical potential between the substrate and a pole of opposite charge.” See paragraph [0005].

In contradistinction, the Sapper reference teaches a powder coating dispersion that is applied via electrostatic spray to form an electrostatic coating. See col. 2, lines 25-25; col. 4, lines 1-5; and see Claim 1. The powder coating dispersion of Sapper is

not equivalent to an aqueous, electrodepositable coating composition of the present invention. Both the physical application and the components for use of the Sapper powder coating dispersion and the present invention are different.

Furthermore, the present claims are directed to an aqueous, electrodepositable coating composition that includes a dispersion of an active hydrogen-functional epoxy resin and an uretdione compound. The uretdione compound comprises the structure:



Thus, the uretdione compound is formed of repeating units, each containing the residue of a diol and two diisocyanates. Such an uretdione compound is an express component of Claim 1 of the present application.

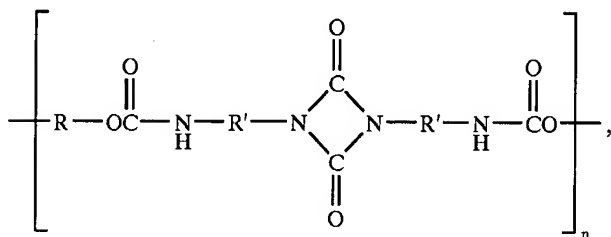
The Sapper reference discloses "crosslinkers" containing isocyanate groups. See col. 7, lines 46-48. The isocyanates "can be obtained by addition reaction of diisocyanates with diols, triols or polyols or diamines, triamines or polyamines, or from diisocyanates by dimerization to give uretdiones, trimerization to give isocyanurates, and with amines to give uretdiones, trimerization to give isocyanurates, and with amines or water to give biurets. Also suitable as crosslinking agents...are diisocyanates and polyisocyanates which contain allophanate, carbodiimide and ester groups." See col. 7, lines 50-57. However, none of these "crosslinkers" in the Sapper reference contemplates the particular uretdione compound of the present invention. Nowhere in Sapper is there listed a uretdione compound formed of repeating units, each containing

a residue of a diol and an uretdione, formed of two diisocyanates. Consequently, Sapper does not describe an uretdione compound formed by condensing two diisocyanates and forming an oligomeric crosslinker by further reaction with a diol as in the present invention.

REJECTION UNDER 35 U.S.C. § 103 – FIORI ET AL. PUBLICATION NO. 2001/0003755 A1

Claims 1-12 are rejected under 35 USC § 103(a) as being unpatentable over Fiori et al., U.S. Publication No. 2001/0003755 A1. This rejection is respectfully traversed.

The present invention expressly requires the use of an uretdione compound. See Claim 1 and Examples 1 and 2 in paragraphs [0029] through [0035]. The uretdione compound is a self-blocking isocyanate compound that does not release volatile by-products during the curing reaction, which reduces regulated emissions and increases the amount of coating solids weight converted to cured coating on the substrate. See paragraph [0007]. An oligomeric crosslinker is prepared by reaction of the uretdione with a diol to provide a product comprising a structure of:



See paragraph [0013]. The present invention also contains an active hydrogen-functional epoxy resin. See Claim 1, paragraph [0016], and the resin mixture of Preparation A in paragraphs [0027] and [0028].

In contradistinction to the present invention, the Fiori reference teaches and prefers an unblocked isocyanate crosslinking agent, the agent being substantially hydrophobic and non-dispersible in water. See Fiori paragraphs [0016] and [0038]; and see Fiori claims 7 and 17. The Fiori reference does disclose an uretdione derived from isophorone diisocyanate as a suitable polyisocyanate crosslinking agent in paragraph [0037], but the reference fails to disclose the uretdione crosslinker of the present invention. An uretdione of isophorone diisocyanate (IPDI) is not the same as the uretdione crosslinker of the present invention because the Fiori reference does not teach or suggest further reaction of the isophorone diisocyanate uretdione with a diol to produce the uretdione crosslinker of the present invention.

The Fiori reference further discloses that urethane adducts having an average NCO (isocyanate) functionality of greater than 2 are particularly preferred, in contrast to the uretdione compound of the present invention. See paragraph [0038]. Urethane adducts in Fiori include an especially preferred example available under the trade designation of CYTHANE® 3174, which is not an uretdione, and has three isocyanate functionalities unlike a self-blocked uretdione which only has two isocyanate functionalities. See paragraph [0038]. These isocyanate compounds in Fiori are unlike the uretdione of the present invention and their stated preference would dissuade a skilled artisan from using an uretdione.

Thus, the Fiori reference does not disclose an uretdione compound further reacted with a diol to form an oligomeric crosslinker. Furthermore, the Fiori reference would not motivate a skilled artisan to make such a compound, as Fiori clearly prefers

other polyisocyanate crosslinking agents; especially urethane adducts having an average isocyanate functionality greater than 2, such as CYTHANE® 3174.

The Fiori reference also does not teach, suggest, or disclose an example of an aqueous coating using an electrodepositable, active hydrogen-functional epoxy resin. Electrodeposition is mentioned in Fiori paragraph [0056], but there is no disclosure of electrodepositing an active hydrogen-functional epoxy resin. In fact, the preferred surface-active isocyanate reactive materials in Fiori involve acrylates, such as methacrylic acid, acrylic acid, and 4-hydroxybutyl acrylate, and may include styrene. See paragraph [0052] and Examples 1 – 22. Therefore, there is no suggestion or motivation for a skilled artisan to use an active hydrogen-functional epoxy resin.

In addition, there is no express or implied suggestion or example in the Fiori reference of combining an electrodepositable, active hydrogen-functional epoxy resin and a self-blocked isocyanate uretdione compound. Instead, all the examples in Fiori involve acrylate resins and unblocked isocyanate compounds. In fact, the combination of an electrodepositable, active hydrogen-functional epoxy resin and an uretdione compound is not suggested or found in any of the Fiori examples. Accordingly, in view of the absence of such a combination or the suggestion of such a combination, and in contemplation of the disclosed preferences and teachings in Examples 1 through 22, a skilled artisan would not find the present invention obvious in view of the Fiori reference.

As a result of these distinctions, Applicant submits the claims are not obvious and are patentable over the cited Fiori reference and requests reconsideration of the claims.

CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (248) 641-1600.

Respectfully submitted,

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By: Anna M Budde
Anna Budde
Reg. No. 35,085

HARNESS, DICKEY & PIERCE, P.L.C.
P.O. Box 828
Bloomfield Hills, Michigan 48303
(248) 641-1600

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